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JULY 2, 1949

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SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE



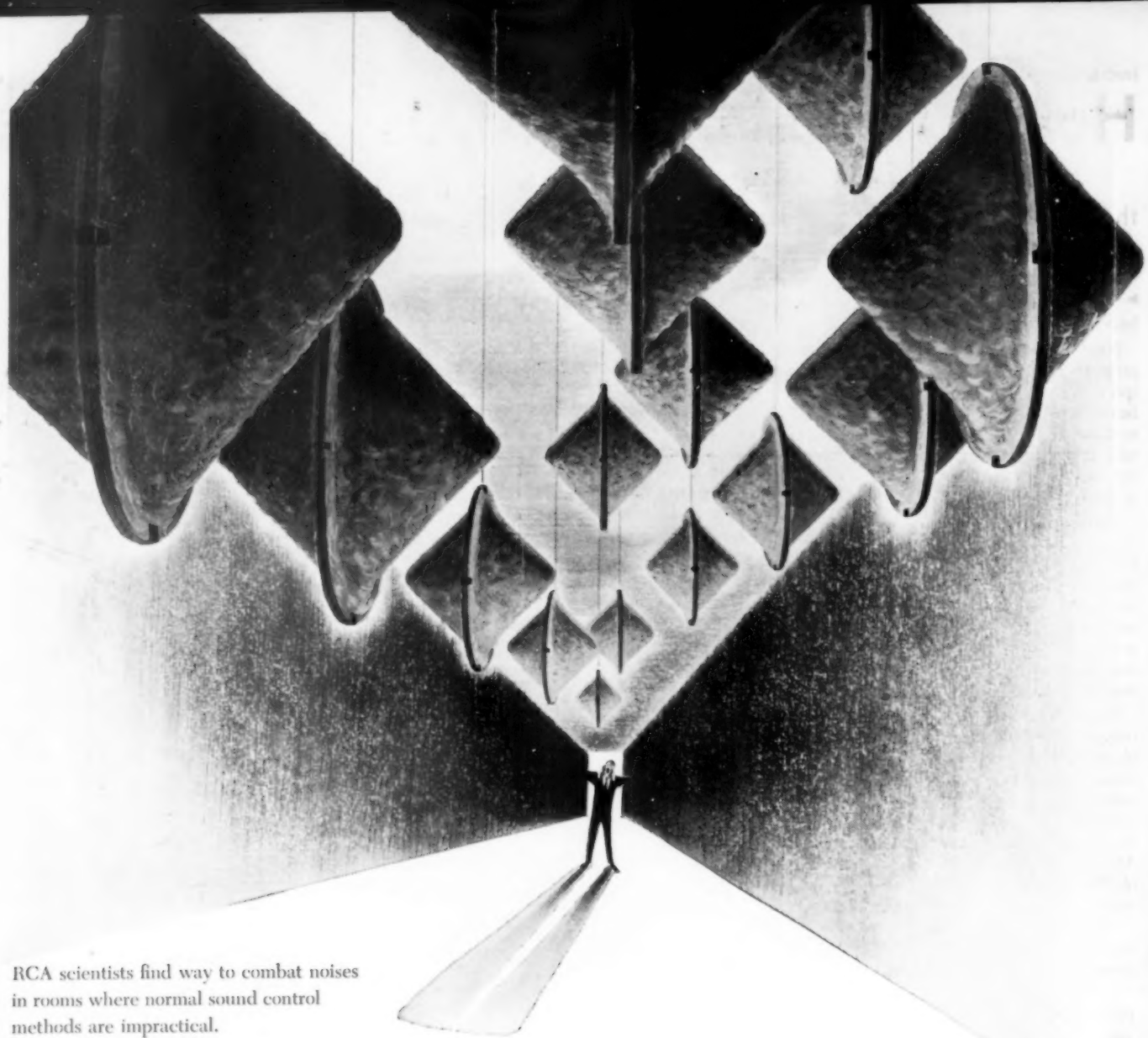
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A SCIENCE SERVICE PUBLICATION

50¢ A YEAR

VOL. 56 PAGES 1-16



RCA scientists find way to combat noises in rooms where normal sound control methods are impractical.

These "Cones of Silence" smother sound!

You think of RCA Laboratories—in part—as a place where scientists work with *sound*, for radio, television, phonographs. This is true, but they are also deeply concerned with *silence*.

One example is a recent RCA development, a way of killing clatter in places where conventional sound-conditioning—with walls or ceilings of absorbent materials—would get in your way. Overhead pipes, ducts or

other fixtures might prevent the installation of a sound-absorbent ceiling—and you wouldn't want to blanket a skylight.

RCA's invention solves the problem in this way: Cones of sound-absorbent substances are clamped together base-to-base . . . then hung in rows where not in the way. Light, inexpensive, easy to install, these "Cones of Silence" convert sound waves into heat energy, and will absorb from 60% to 75% of the clatter in a noisy room.

How you benefit:

Development of this functional sound absorber indicates the type of progressive research conducted at RCA Laboratories. Such leadership in science and engineering adds *value beyond price* to any product or service of RCA and RCA Victor.

The newest developments in radio, television, and electronics can be seen in action at RCA Exhibition Hall, 36 West 49th St., N. Y. Admission is free. Radio Corporation of America, Radio City, N. Y. 20.



RADIO CORPORATION of AMERICA

World Leader in Radio — First in Television

NUCLEAR PHYSICS

Heavy Nuclei Bombard Us

Discovery of heavy particles at 18 to 20 miles above the earth was reported. Existence of heavy nuclei as well as protons in cosmic rays was demonstrated.

► THE earth is being bombarded with very heavy stuff, atomically speaking.

Nearly a third of the total mass of the projectiles in the cosmic rays from outer space consist of stripped-down hearts of heavy atoms, the University of Denver International Cosmic Ray Symposium was told in Idaho Springs, Colo. Discovery of the heavy particles at 18 to 20 miles aloft is the top news being discussed.

Two teams of scientists, one at the University of Minnesota and the other at the University of Rochester, have demonstrated that the heavy nuclei really do exist in the mysterious cosmic rays that come in from outer space. Before it was thought that they were exclusively protons, positive particles that are also one of the building blocks in atomic hearts.

Dr. Frank Oppenheimer, who has just resigned his professorship at the University of Minnesota after having told a Congressional committee of his experiments in communistic theory over a decade ago, is the leader of the Minnesota group reporting to the symposium which is sponsored by the Atomic Energy Commission and the Office of Naval Research among others. Dr. Edward Ney, also there, Dr. George and Phyllis Frier, a husband and wife team, and Dr. E. J. Lofgren were in the Minnesota group.

The Rochester experimenters are Drs. H. L. Bradt and Bernard Peters.

This spring the Navy aircraft carrier Saipan on a mission to the Caribbean launched balloons to high altitudes to see if the heavy particles came into the earth's atmosphere at the earth's magnetic equator as plentifully as they do farther north.

The heavy particles are believed to be the central mass of chemical elements, stripped of their electrons, ranging from carbon to molybdenum. They plunge toward the earth with energies that are a hundred billion electron volts, which means that the elementary particles that they carry (protons and neutrons) each have few billion electron volts. These energies are much higher than those that man with his cyclotrons has been able to create and impress upon particles here on earth.

Just now it is a puzzle as to where the particles come from and how they get their energy. That is one of the reasons for the high-powered research upon the cosmic rays. For as they are better understood, the way the universe is put together may be understood better. There may come out of this highly theoretical work with little particles that are here and there knowledge that will give us new methods of control of atomic energy for war or peace.

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AIR BRAKES—The jaw-like control surfaces shown above at the outer end of the wing trailing edge on a Northrop Scorpion, twin-engine, jet-propelled, all-weather fighting airplane are known as "decelerons" because they combine the functions of ailerons, fighter brakes and landing flaps. In normal flight the jaws are closed. In dives, the jaws are opened to provide effective fighter brakes.

light, spread out into its component wavelengths to give bands of colored light crossed by numerous dark and bright "spectral" lines. These lines can reveal the chemical elements present in the stars.

The Wisconsin astronomer said that the new machine will not only give more accurate spectrogram measurements, but it will also be easier on the astronomer. It all but does away with eyestrain and fatigue and eliminates personal judgment, and personal error, plus offering increased speed.

With the electronic machine, most of the job is done automatically: the astronomer pushes a button to indicate the spectral lines to be measured, and the reading is recorded for him on photographic film. Previously astronomers have generally examined the faint lines from a star under a microscope. This, particularly in the case of a very hot star, required much practice and many measurements.

One major limitation remains the same as for direct eye measurements. This is the grain of the photographic plate on which the spectrum of a star is taken. Scientists can take some steps to get easy-to-measure lines, but sometimes stars make their own spectra with fuzzy lines.

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MEDICINE

Stomach Cancer Detection

► FIVE "filters" that can help with mass tests for detection of stomach cancer were reported by Dr. David State of Minneapolis to the American Medical Association in Atlantic City.

The "filters" were designed to detect stomach cancer before symptoms developed and to determine persons in whom the disease is likely to develop. Instead of X-raying all persons over 50 years old, the age group in which stomach cancer is most likely to develop, the Minneapolis doctor suggests filtering out the most susceptible by tests for pernicious anemia and the stomach's production of acid in response to doses of histamine.

None of 79 persons who had a family history of stomach cancer had stomach cancer themselves, X-ray examinations showed. Neither did any of the 72 who were losing such small amounts of blood that it could only be detected by chemi-

cal tests. But of 1,206 whose stomachs failed to produce acid in response to the test, seven were shown to have stomach cancer. So did one of the 178 whose stomachs produced a little but less than the normal amount of acid in the test and three of 94 who had pernicious anemia.

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ASTRONOMY

Electronics Helps Reveal What Makes Up the Stars

► NEWEST job for electronics is to help astronomers discover what makes up stars.

Harold L. Johnson of the University of Wisconsin's Washburn Observatory described a new electronic plate-measuring machine to the American Astronomical Society in Ottawa, Canada. Plates measured by the machine are photographs of star

ENGINEERING

Checking Metal Corrosion

► THE POOLING of knowledge on metal corrosion and its prevention, gained from scientific research by many men in various parts of the world, is responsible for modern methods now widely applied to give metals in use longer life, the UNSCCUR will be told at its Lake Success meeting this summer by F. L. LaQue of the International Nickel Company, New York. This is the international United Nations Scientific Conference on the Conservation and Utilization of Resources.

The most effective means of preventing corrosion, not including the use of protective coatings such as grease, paint and zinc, will be reviewed by him. They include humidity control, de-aeration, the use of inhibitors, cathodic protection, design and the use of alloying materials.

Since practically all common corrosion processes require the presence of water, or water vapor, it is possible to prevent corrosion by eliminating water, he will say. It has been established that when the relative humidity is kept below 30% corrosion will be negligible. The control of humidity in large spaces can be accomplished by the use of air-conditioning equipment. With packaged apparatus, the air within can be kept dry with the use of a suitable moisture-absorbing substance such as silica gel. When the package is a metal container, the inside air can be replaced with an inert gas such as nitrogen.

De-aeration, or deaeration, includes the removal of atmospheric or other oxygen from the environment. Oxygen plays a part in much corrosion. An example of the application of this process is in the use of a deaerator in the treatment of boiler feed water. It is possible to reduce the oxygen content of water below 0.01 part per million, he will state. Deaeration has also been applied successfully to the prevention of cor-

rosion of steel pipe lines used to carry otherwise corrosive water for long distances.

Inhibitors are defined by him as compounds that stifle either the anodic or cathodic portions of the normal corrosion reaction, or both. Most inhibitors function as chemically or physically absorbed films which either alter the electrochemical characteristics of the metal, or serve as mechanical barriers to the normal corrosion processes. The reaction of various chemical inhibitors will be described by Mr. LaQue.

Cathodic protection, first used in 1824 by Sir Humphrey Davy, is one of the most effective means of preventing or arresting corrosion. It is based on the principle that most corrosion of practical importance is electrochemical in nature and results from the flow of current through an electrolyte between areas of different potential which may exist on the surface of a single metal or between two or more different metals. The solution is to bring all surfaces to the same potential.

This can be accomplished in most cases by introducing a current to offset the one produced by the difference in potential. In Mr. LaQue's language, "by discharging current on the more noble (cathodic) surfaces so as to achieve their cathodic polarization to the potential of the adjacent anodes." By far the most important application of cathodic protection has been in connection with the thousands of miles of underground oil, gas and water pipe lines, and power and communication cables.

Good design for metal structures avoids crevices favorable to corrosive action, or to galvanic action that could cause corrosion. It is bad practice, according to Mr. LaQue, to use threaded connections between dissimilar metals; brazed or welded points are much better.

One of the most effective means of in-

creasing the durability of the elemental metals is to combine them in alloys or to control their minor constituents so as to achieve the corrosion-resisting properties desired. Stainless steel is the most spectacular example. Iron alloyed with chromium and nickel, sometimes supplemented with molybdenum, columbium, titanium, silicon, copper or tungsten added for specific purposes, may have its ability to resist corrosion increased 100,000 times that of ordinary iron.

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NUCLEAR PHYSICS

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ASTRONOMY

What Makes Up a Comet?

Comets are born with hearts of "ices" of gases, a new theory holds. As this solid nucleus approaches the sun, the heat turns it into a huge gaseous cloud.

► A COMET is formed from a heart of "ices" of common gases, starting in the outer reaches of the solar system, an astronomer proposed.

Dr. Fred L. Whipple of Harvard College Observatory suggested that this solid nucleus, or heart, is turned into the huge cloud of gas, which makes up the head of the comet, by heat as it approaches the sun. Dr. Whipple's answer to a baffling riddle of the solar system—What is a comet?—was given to the American Astronomical Society meeting in Ottawa, Canada.

The "icy" solid heart from which the comet head is formed would not be large. Its diameter would be four miles, at most, and more likely about a half mile. In addition to water in its solid form, ice, Dr. Whipple believes that the solid forms of the gases ammonia, methane, carbon monoxide or carbon dioxide and carbon nitride are in the comet nucleus.

In addition to the "ices," the heart probably contains some bits of solid matter similar to meteors, or shooting stars. And there is a layer or shell of this matter outside the nucleus, through which the evaporation of the "ices" takes place.

The famed tail of the comet is known to be caused by the pressure of the sun's radiation which sweeps back gases and dust of the comet's head.

To have an "icy" heart, the comet nucleus must begin its lengthy travels far out in the solar system, practically out in interstellar space but still within the gravitational pull of the sun. Some comets are known which probably take millions of years to complete one journey around the sun. Others which have much shorter periods, such as those in planet Jupiter's comet family, may have been captured by the planet's gravitational pull, Dr. Whipple explained.

As the comet moves through the solar system, it gives off some of the gases, and this accounts for changes in its path, or orbit. Also lost are some of the bits of meteoric matter which cause the showers of shooting stars when these solid pieces of a comet strike the earth's atmosphere.

Under Dr. Whipple's theory, the ovalness, or eccentricity, of a comet's orbit would increase or decrease, depending on whether the comet's rotation was in the same or opposite direction as its path around the sun. If it is the same, the emission of gases would be backward, and the orbit's eccentricity would increase.

Thus, a well-known comet, Encke, has

been observed to be decreasing its eccentricity, so it is believed to be rotating in an opposite direction from its path.

Dr. Whipple calculates that this comet has to lose only one five-hundredth of its

AERONAUTICS

Non-Protruding Antennas

► SOME of the steps taken by the U. S. Air Force to eliminate drag on speedy planes caused by protruding radio antennas were revealed at the Wright-Patterson Air Force Base in Dayton, O. Over 600 horsepower is saved for propulsion purposes in some of the larger planes which may have as many as 15 receiving and sending antennas.

The new antennas, of which there are several types, are hidden in the skin of the plane or buried beneath the skin. In addition to being positioned where they cause no drag as protruding antennas do, they are safe from icing, precipitation static, the sealing out of moisture, and danger of breaking off at high speeds.

Flush-mounted antenna is a general term

mass each time it passes near the sun to account for the observed change in path. He estimates that comet Encke will last for about 2,000 years more.

Dr. Whipple's theory of what makes up a comet, agrees with another new theory of how a comet starts. An English astronomer, R. A. Lyttleton of Cambridge University, recently proposed that the comet nucleus is formed by dust and gas pulled together by the sun's gravity.

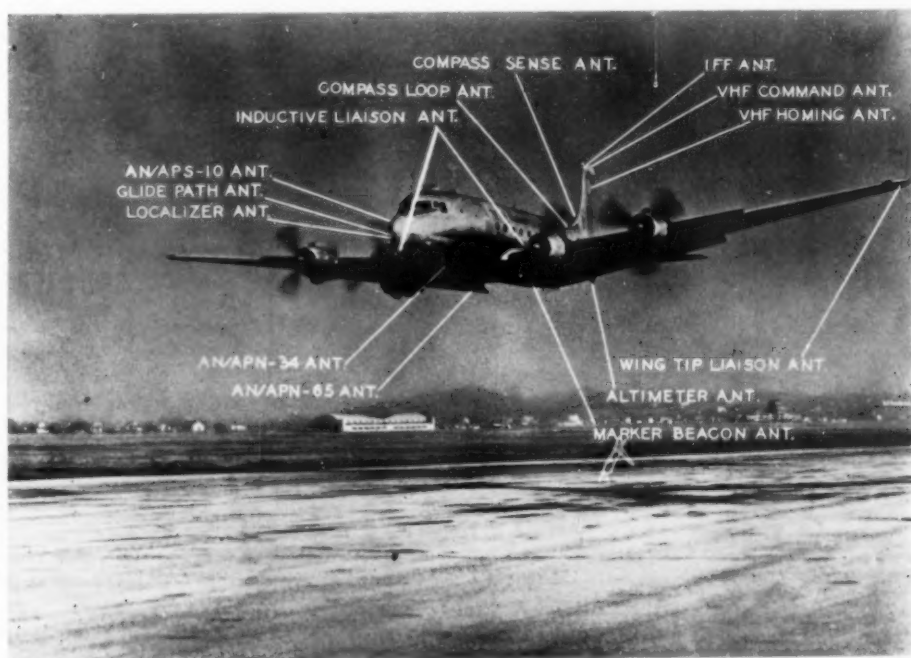
The English astronomer suggested that this takes place 20 to 1,000 times the distance from the sun of the earth. Dr. Whipple's theory favors the longer distance.

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that applies to the new types. One is a pickaxe shaped antenna which rides inside the aircraft tail, protected by a plastic radome. A slot type is a slit in a thin metal sheet set in the airplane surface and covered with a dielectric material.

One of the latest developments in the field of zero-drag is the use of all or part of the airplane fuselage itself as an antenna. This technique has been necessitated by the use of low radio frequencies which require antennas sometimes as large as the aircraft they serve.

The solution of this problem came by isolating a small portion of the plane, for example a wing tip, and then feeding voltage across the plastic-covered isolating section, thereby exciting the entire wing.



15 BURIED ANTENNAS—Several hundred horsepower are saved by this new mounting of antennas under the aircraft skin. The former exterior mounting of antennas caused a drag on speedy planes.

Utilizing the same principle in an isolated tail cap, the fuselage can be energized to act as an antenna, Air Force scientists explain. The wing can also be energized by inserting an exciter coil close to it in the fuselage and electrically inducing energy over into the wing structure.

The importance of flush-mounting can perhaps best be seen in a C-54 cargo plane which has been outfitted with 15 dragless

antennas of all types. Two of these antennas are in the wings, three in the nose, four in the tail, two in the dorsal fin, and four in the fuselage. These include antennas for the marker beacon, Command very high frequency (VHF) set, identification equipment of the automatic IFF (Information, Friend or Foe) type, VHF homing device, loran (long-range navigation equipment), radio compass, and altimeter.

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ENGINEERING

Gas Turbine Locomotive

See Front Cover

► THE wraps have been removed from America's first gas turbine-electric locomotive which was demonstrated to a group of railroad men, engineers and scientists in Erie, Pa. Its primary power is its gas turbine engine, a powerplant already widely used in stationary installations and coming rapidly into use in speedy airplanes.

The gas turbine engine is somewhat similar to the better-known steam turbine, but it utilizes high pressure jets of gas delivered against vanes on a shaft to cause speedy revolution of the shaft. The type used on airplanes, together with the means of propulsion, is often called the turbo-prop to distinguish it from the turbo-jet used in direct jet propulsion. In the turbo-prop the gas engine drives conventional propellers geared to the shaft to which the vanes are fixed.

This new gas turbine-electric locomotive shown on this week's cover of the SCIENCE NEWS LETTER is a product of the American Locomotive Company and General Electric. The turbine drives the electrical equipment that provides the operating power. The electrical system is not new except for minor details. Similar systems are in use on diesel-powered locomotives. The gas turbine, developed for this particular application, differs in certain respects from other types.

Basically all gas turbines are much alike as far as general principles go. Air is drawn through a compressor into several combustion chambers where fuel is injected and the mixture is burned. Burning of the fuel

raises the temperature of the compressed air. The resulting gases are then expanded and move at great speed against the turbine buckets, or vanes, turning the shaft. Derived shaft power drives the load and the power plant compressor rotor.

The new Alco-G. E. unit delivers 4,500 horsepower. The locomotive has completed many road tests since November, 1948, and now will go into freight service on the Union Pacific for additional tests.

"Much remains to be done, even though it has completed certain road tests and performed very creditably," the group was told by Charles E. Wilson, president of General Electric. "But we certainly can assure you of one important thing: if the gas turbine-electric locomotive has possibilities as a major factor in railroad motive power, engineers of the General Electric Company and the American Locomotive Company will find that out!"

"The locomotive of the foreseeable future is the diesel-electric," the group was told by Robert B. McColl, president of Alco. "Today we are proud that we are furnishing the railroads in ever-increasing quantities with this efficient form of motive power." But he indicated faith in the new gas turbine type.

The present gas turbine locomotive burns low grade bunker oil for fuel. It exerts about twice as much horsepower at the rails as a diesel-electric locomotive of comparable size. Its power plant was described as at present much less efficient than the diesel engine. But with improvement in design and the use of better alloys its efficiency can be raised.

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AERONAUTICS

German Wind Tunnels

► WIND TUNNELS of German origin at the White Oak Naval Ordnance Laboratory near Washington, already employed but just now going into official operation, are expected to play an important part in the development of American aviation and particularly in the perfection of guided missiles.

These tunnels were captured by the Amer-

ican Army in Bavaria late in the recent war, dismantled and shipped to this country and reerected at the White Oak site with the help of German technicians from the Bavarian group brought over for the purpose. They are the same tunnels in which the famous German V-2 rocket was developed.

The former German aerodynamics facilities, together with improvements developed at White Oak, were described by Dr. Raymond J. Seeger and Lyman C. Fisher of the Naval Ordnance Laboratory. They spoke as guests of Watson Davis, director of Science Service, on Adventures in Science, heard over the Columbia network.

Scientists at the White Oak Laboratory have recorded air speeds with the use of these tunnels more than five times faster than the speed of sound. Roughly it was equivalent to 3,960 miles an hour, Dr. Seeger stated. And, he added, that they envision even greater speeds will be possible when new ballistics ranges are completed. He expressed confidence that speeds up to 8,000 miles an hour are within reach, and stated that scientists at the laboratory predict figures as high as 12,000 miles an hour.

The new ballistics ranges were described by Mr. Fisher as unique. There are two of them. One is operated at atmospheric pressure, while in the other the pressure can be controlled to simulate a wide range of flight conditions. They will be used for basic research and also to check the information obtained in the wind tunnels, he said. In a wind tunnel, the model under test remains in one place and the air passes around it. In the ballistics range, the model is actually fired through the air.

A unique feature of these former German wind tunnels is the way air is forced through them. In most tunnels the air current comes from huge fans blowing the air into and through them. In the White Oak installation, the air current is the result of suction. A 52-foot steel sphere is employed. Vacuum pumps remove the air from the sphere. A valve is then opened, and air rushes through the tunnel into the sphere.

The air can be pumped out of the sphere in about ten minutes. It is refilled with air sucked through the tunnel in about 40 seconds. Forty seconds is, therefore, the testing time. To measure all the positions a missile will actually endure in flight means the running of many separate tests.

But what happens in this very short period can actually be noted through a specially designed optical system, which means that in a sense the wind can be seen, and high-speed photography makes pictures for later study. In studying the pictures, such things as temperature, humidity and the position of the missile undergoing test must all be considered.

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Scanning radar, to detect approaching aircraft in the skies, can be given a far greater range than the ground-based equipment now has by mounting it in patrolling aircraft.

Strawberries have a higher vitamin C content than any of the other fruits commonly grown in northeastern states.

MEDICINE

Starvation Study Made

Twenty-two starving Jewish doctors made an objective study on the effects of hunger on the men, women and children confined in the Nazis' Warsaw Ghetto.

► A SCIENTIFIC study of hunger, made by physicians who, like all their patients, were starving to death, has just been published.

The authors of this book, "unique in scientific history," were 22 Jewish physicians confined to the Ghetto established by the Nazis in Warsaw in 1940. The last survivor of this group of doctors, Dr. Emil Apfelbaum, died in January, 1946, as a result of his experiences. Originally written by hand in Yiddish on official German Army stationery, the scientific manuscript has been translated into French and published in Warsaw by the American Joint Distribution Committee.

The story of the 500,000 men, women and children completely isolated in Warsaw Ghetto, with no soap, no fuel, no gas or electricity, often no water and no more than 800 calories a day of food, has been told. So has the story of their final armed resistance, their 42-day battle against the German Army, which ended when the last living Ghetto fighter wrapped himself in a flag and threw himself from the roof of the last standing building into the flames below.

Practically unknown to most Americans, including scientists, is the story of the cooperative medical research on starvation carried out by the 22 Jewish physicians.

"The complete scientific detachment of the authors of these studies from their own fate, and from the infernal background and surroundings of their studies, is almost incredible," declares Dr. Martin Gumpert, physician and author of New York, in his account in *THE AMERICAN SCHOLAR*.

In February, 1942, these physicians, recognizing the opportunity to add to scientific knowledge of the effect of starvation on the human body, began their practical work. Many essential scientific instruments were lacking. Those they had were bought outside the Ghetto and smuggled in at the risk of death. The doctors met monthly to discuss their observations. They "worked feverishly without a day's interruption, and in the months at their disposal accumulated a quantity of experiments and observations which would have taken many years to collect under normal conditions," Dr. Gumpert states.

The studies were made on children from six to 12 years and young adults from 20 to 40 years. These ages were chosen so that the biochemical changes of infancy, adolescence and advancing age would not affect the studies of the effects of starvation by itself.

"There is no mention of Hitler in the 262 pages of this work," Dr. Gumpert states. "The word 'Nazi' does not appear. There is no discussion of politics, no note of self-pity."

"The mental changes and attitudes of the children are among the earliest symptoms of hunger: their apathy, which increases with the progress of starvation," is the written observation of one of the 22 physicians, Dr. A. Braude-Heller.

"The organism which is destroyed by prolonged hunger is like a candle which burns out: life disappears gradually without a visible shock to the naked eye," reported Dr. Apfelbaum.

"The hunger sufferer grows lazy. He is a miser who avariciously guards what is left to him—that is, his last physical reserves. His motions are calculated, his slowness, sometimes even the complete lack of motion for several days, are very characteristic; his tendency to remain in a lying position, the somnolence, the silence, the sluggishness of the reflexes, the mental drowsiness: this is the customary picture of cachexia (marked ill health and malnutrition) due to hunger," Dr. Apfelbaum reported.

"Our study," he stated in his section of the report, "has aimed at an understanding of the mechanism which regulates this economizing of energy. The results should throw some light on the pathology (diseased state) of hunger. The material that was at our disposal cannot be compared with any thus far known, because of its magnitude and the advanced degree of starvation."

The orderly, scientific study of starvation continued until at last it was obvious that the manuscript must be removed from the Ghetto while there was still time. It was delivered to Dr. Witold Orlowski of the University of Warsaw.

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ENGINEERING

Discharge Jumps 50 Feet In New High-Voltage Lab

► MAN-MADE "lightning" of 15,000,000 volts jumps 50 feet between two huge condensers in the new high-voltage laboratory of General Electric, in Pittsfield, Mass. It is said to be the greatest man-made high-voltage discharge in the world.

General Electric has carried out research in high voltages for many years, most of



MAN-MADE LIGHTNING — A streak of flame, then complete vaporization is the fate of a strand of copper wire charged with 5,000,000 volts of electric power in the new GE High Voltage Laboratory.

the work having been done so far in the old laboratory there or atop the Empire State Building in New York City. At the latter site, natural lightning was recorded during summer periods by means of photography and automatic recording instruments that provide data of value in determining voltage and other matters.

The new laboratory marks a forward step in the entire field of high-voltage research. The objective behind such research is to find the best means of eliminating the hazards of lightning in electric service, and to permit the transmission of steadily higher and higher voltages.

Second only to the 15,000,000-volt discharge at the laboratory is a three-phase arc. In demonstrating this arc, flames caused by tremendous high voltage climb high toward the ceiling. Planned is a series of demonstrations to show the effects of lightning on a scale model of a city street. In it man-made "lightning" will strike the buildings, first protected with lightning arresters and similar equipment, and then without such protection. Model airplanes will be used also to demonstrate the effect of lightning upon modern all-metal aircraft as distinguished from fabric covered planes.

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The *sherardizing method* of coating steel with zinc, employed with such objects as nuts, screws and bolt, consists of putting the articles and zinc dust in a revolving container with heat applied; the contact and heat do the coating.

DENTISTRY

Chlorophyll Tooth Paste May Be Decay Preventive

► A GREEN tooth paste containing chlorophyll, the green coloring matter of plants, was reported as a possible preventive of tooth decay.

Tests showing a drop in the number of *Lactobacillus acidophilus* organisms following the use of this paste were reported by Dr. Gustav W. Rapp of Loyola University, Chicago College of Dental Surgery, at the meeting of the International Association for Dental Research.

Dr. Rapp's report did not show whether the subjects of the experiment had more or less caries after using the tooth paste.

The chlorophyll tooth paste was used by 50 persons. Another tooth paste followed by a chlorophyll mouth wash was used by another 30 persons. They also had a drop in *Lactobacillus* count. A third group of 15 persons, used as a control, followed their normal tooth cleaning procedures, with less change in the bacterial count.

Dental authorities usually consider it necessary to have tests of tooth decay activity on several hundred persons, with controls on several hundred more, matched according to age, sex, race, diet, living conditions, X-ray studies and other factors, in order to evaluate any suggested anti-caries remedy or procedure.

The number of *Lactobacillus acidophilus* organisms in a person's saliva is sometimes taken as a sign of caries activity, and it is on this that Dr. Rapp's studies were based.

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NUCLEAR PHYSICS

Atomic Power Plants Need Instrument Development

► SPECIAL instruments that can be used in areas of intense radiation and high temperatures must be developed before atomic power plants can be widely used, the American Society of Mechanical Engineers was told in San Francisco by David Cochran and C. A. Hansen, Jr., General Electric engineers at the Knolls Atomic Power Laboratory.

As yet there are no demonstrated solutions to the unusual problems of applying instruments in an atomic power plant, they declared. The biggest obstacle to development of instruments for operating and maintaining an atomic power plant is lack of instrument testing facilities. These, however, will probably soon be available.

Only a few places exist in the country where the effect of radiation on materials and devices may be studied, or where liquid metal cooling systems are available for instrument testing. And nowhere, they stated, is there a combination of radiation and high temperature liquid metal

such as will exist in the atomic power plant.

Instruments are needed for control and safety of plant operation, for observing the condition and behavior of the plant, and for monitoring radiation leakage to assure protection of operating personnel. They must have extreme reliability, remote maintenance, resistance to neutron and gamma radiation, absolute leak tightness and long service.

Maintenance by remote control is necessary, they continued, since it is not possible to perform direct inspection and maintenance work on the detecting devices within the radioactive zone. When a failure occurs it may be necessary to remove and replace the instrument by means of remotely operated equipment, they said. Where the detecting elements are very difficult to remove, standby detecting elements must be installed at the time the plant is built.

Science News Letter, July 2, 1949

CHEMISTRY

Gelsoy from Soybean Is Good as Gel And as Glue

► THE Far-East soybean, already one of America's top-notch crops producing oil, meal, food, feeds and fodder, is now yielding a tight-sticking glue, dubbed Gelsoy, which is also a valuable food product, it was revealed at the Northern Regional Research Laboratory of the U. S. Department of Agriculture in Peoria, Ill.

It is said to be the first vegetable protein gel. As a glue, it could be used on envelopes which could not be "steamed" open. The heat of the steam will simply make the envelope flap stick tighter. Gelsoy glue will stick to tin, glass and other surfaces, so may play a big part in sticking labels on preserved foods in cans, jars and pottery containers. Many other uses are possible.

As a food, because of its bland taste and its whipping and gelling properties, many uses are possible. It is a nutritious substance, about half soybean protein and half carbohydrate, that has many of the qualities of egg white. It can be whipped into frothy meringues for pies, is useful in cookie and cake fillings, and may find its way into ice creams, candies, prepared cold meats, soups and other foods.

The value of Gelsoy as a gelling agent for food products and as an adhesive is a discovery credited to Mrs. Letta I. DeVoss, a scientific aide in the laboratory. Laboratory scientists had derived the new substance from the soybean, and Mrs. DeVoss started cooking a batch to test its whipping qualities. When it reached a temperature of about 190 degrees Fahrenheit it formed a jelly-like mass. For this discovery, she was given a Superior Service Award by Secretary Charles F. Brannan for the Department of Agriculture.

Science News Letter, July 2, 1949

IN SCIENCE

BIOCHEMISTRY

Influenza Virus Made Radioactive

► A WAY to make influenza virus radioactive is announced by two Canadian scientists in the journal NATURE (June 18).

Their idea, apparently, was not to make the 'flu virus any deadlier, but, instead, to learn more about the mechanism of its synthesis, or growth, in the cells of the body.

They injected influenza virus into the fertile hen's eggs and then three hours later injected a solution containing radioactive phosphorus. In one of the experiments the radioactive solution injected into each egg registered 57,000 counts per minute on a Geiger-Müller counter.

After about 48 hours the virus which had been growing in the eggs was harvested and purified. Geiger-Müller counts and other tests showed that the virus had taken the radioactive phosphorus into its structure just as it would have taken up ordinary phosphorus.

The scientists reporting this are Drs. A. F. Graham and Laurella McClelland of the University of Toronto.

Science News Letter, July 2, 1949

ASTRONOMY

Giant Atomic Explosion Noted on Near Star

► ANOTHER violent atomic explosion has been observed on the earth's second nearest star neighbor.

The star, known as L-726-8, was announced by its discoverer, Dr. W. J. Luyten of the University of Minnesota only last April. At that time it was reported that photographic plates had revealed a flare-up on the star on Dec. 8, when it suddenly became much brighter, only to die down to normal in a few minutes.

Another flare-up has now been found, this one on the last day of 1948. One photo plate showed that it was 10 times its normal brightness. Another plate, made six minutes later, showed the star to have dropped to six times normal brightness. Within 20 or 30 minutes, it was back to its normal brightness.

These star flare-ups are caused by tremendous atomic explosions, many times more violent than any man-made atomic bomb.

Even at the height of such a flare, the recently-discovered star is not visible to the naked eye.

Science News Letter, July 2, 1949

SCIENCE FIELDS

MEDICINE

Anti-Airsickness Drug May Make Pilots Sleepy

► COMMERCIAL airline pilots are being "advised" by the Civil Aeronautics Administration that the new anti-air sickness drug, dramamine, may make them sleepy.

If an occasional passenger gets drowsy it won't hurt, but for the pilot to have this reaction might be dangerous, the CAA points out. Tests were made on 22 CAA employees, who did not know whether the capsules they took each morning contained dramamine or milk sugar or a sleeping medicine. In two-thirds of the cases where dramamine was taken, mild side reactions were noted.

Not all persons who take this new medicine for motion sickness get drowsy. It is not a sedative, but an anti-histamine drug originally developed for treatment of allergies. Other anti-histamine drugs taken by hayfever, asthma and hives patients have caused sleepiness in an occasional, sensitive person. Slight dizziness, chills and detached sensations, loss of balance and difficulty of focusing eyes also occur occasionally, the CAA found.

Science News Letter, July 2, 1949

ENGINEERING

Selector Sorts Out Vast Amount of Information

► THE "rapid selector," newest of the famed postwar "electronic brain" machines, has been unveiled at the U. S. Department of Agriculture, with a promise of shorter hours in the library for researchers.

Information to be coded for the selector is put on 35-millimeter motion picture film; contents of some half-million conventional library cards can be put on a single reel. When you want all the information on a certain subject which is on some of the cards, you place a master key card in the machine. Photoelectric "eyes" of the machine pick the material you want and the machine photographs it for you.

The selector can scan the film at a rate of more than 60,000 subjects a minute. Some 10,000,000 different subjects can be coded in the selector potentially.

Information to be stored in the selector is microfilmed and coded by the use of black and white squares. It is the pattern of squares which catches the "eye" of the photoelectric cell. Photographing of the selected information is done by using high-speed photoflash techniques, including a repeating flashlamp.

Scientific literature and any other ma-

terial containing vast amounts of information which need to be stored compactly yet available for use are expected to be put into rapid selector machines. It is estimated that the new machine could scan in 15 minutes all the entries in Chemical Abstracts, a standard guide to chemical research, which have appeared in the past 30 years.

The first rapid selector is now being tested in the Department of Agriculture library under the direction of Department Librarian Ralph R. Shaw. Mr. Shaw supervised development of the machine which was done by Engineering Research Associates of Minneapolis, under an appropriation of more than \$75,000 from the Department of Commerce's Office of Technical Services. Principles from which the machine was developed are credited to Dr. Vannevar Bush, president of the Carnegie Institution of Washington.

Science News Letter, July 2, 1949

MEDICINE

New Muscle-Relaxing Drug Helps in Mental Patients

► MYANESIN, also called tolserol, a relatively new muscle-relaxing drug, now shows promise of helping in treatment of mental patients and alcoholics.

Preliminary trials of the drug in 63 patients are reported by Dr. Louis S. Schlan of Maneno, Ill., State Hospital and Dr. Klaus R. Unna of the University of Illinois College of Medicine in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (June 25).

Its greatest benefits, apparently, will come in treatment of prolonged alcoholic intoxication and of anxiety states in mental patients.

The eight alcoholics, each with "shakes" after prolonged bouts, were able to lift a coffee cup in one hand without spilling within 30 to 60 minutes after taking the medicine. Before taking it they could not raise the cup to their lips without spilling even when using both hands.

Besides the physical "shakes," their severe jittery feelings, or anxiety in psychiatric terms, were promptly relieved and the patients reported feeling comfortable though they still had such "hangover" effects as headache and stomach distress. They also said they got relief faster than with other sedatives and felt "wide awake" and closer to "normal."

The mental patients with anxiety were calmed without being put to sleep. They were able to sleep normally though previously their disturbed mental state had kept them awake.

The drug, the doctors state, is the only one they have seen "which allays anxiety without clouding consciousness. As such it promises to be helpful as an adjunct to psychotherapy."

Science News Letter, July 2, 1949

ASTRONOMY

Second Moon Discovered For Planet Neptune

► A NEW moon has been added to the 29 known moons in the solar system.

A second satellite to Neptune was confirmed by Dr. Gerard P. Kuiper, University of Chicago astronomer, who announced the possible discovery of the moon May 1 at McDonald Observatory, which is jointly operated by the University of Texas and the University of Chicago.

Discovery of the satellite, which is 250,000 times fainter than the faintest star visible with the naked eye, was announced by Dr. Kuiper at the summer meeting of the American Astronomical Society in Ottawa.

Five million miles from Neptune and 3,000,000,000 miles from earth, the second satellite was established as a second moon to the planet Neptune from studies of photographic plates taken May 29 on the 82-inch reflecting telescope at McDonald Observatory.

The satellite, Dr. Kuiper announced, is only 200 miles in diameter, 15 times smaller and 250 times fainter than the first satellite to Neptune, Triton, which was discovered in 1846. Its magnitude of 19½ degrees makes it the faintest moon observed to date, so faint that it probably cannot even be seen through the 200-inch reflecting telescope.

Dr. Kuiper, who discovered a fifth moon to the planet Uranus in March, 1948, estimated that the new moon, moving in nearly the same plane as Neptune, requires two years to complete its cycle. Earth's moon completes its orbit in one month.

Science News Letter, July 2, 1949

PSYCHOLOGY

Psychologists' Must Reading: Comic Strips

► WITH comic strip characters invading psychological tests, daily reading of the comics has become a line of duty activity for members of the staff of the Menninger Foundation in Topeka, Kans.

The comic strip characters got into the Rorschach tests, a report from the Foundation explains. In these tests patients are given cards with standardized blobs of color or black spots on white, like ink blots. From the patient's interpretation of what these blobs look like to him the psychologists get important clues to the patient's personality and illness.

Witches on broomsticks, dancing fairies, and various animals used to be among the responses given. Now the patients say the blobs look like various comic strip characters.

"The result," says the report, "is that psychologists have a perfect excuse for reading the daily comic strips."

Science News Letter, July 2, 1949

MEDICINE

Unique Animals Aid Science

Mice that have fits are helping scientists study diseases of the nervous system, while dogs who broadcast their feelings help environmental and heredity studies.

By JANE STAFFORD

► A CAT with four ears, a "fierce" bunny rabbit, mice that have fits when the doorbell rings, dogs that broadcast how they feel when burying a bone or chasing a stick seem like imaginary characters in a nursery tale.

Actually these strange characters are real animals. They and their ancestors and offspring and other relatives are playing an important part in man's fight against disease.

The mice that crack up when a bell rings belong to a mouse family that develops breast cancer in a high proportion of its female members. They are of a special strain, bred to develop cancer, so that scientists could study this disease in the search for better ways of fighting it.

The cancer fighters who bred these mice, however, are not just fighting cancer. They are trained to observe every little detail about their laboratory animals, and they are constantly probing into the fundamentals of cancer, particularly the genetic, or hereditary, background which influences growth of all kinds, normal as well as cancerous. So when the mice broke down and went into convulsions at the sound of a loud bell, the scientists recognized that these mice had developed a strange kind of nervous system. The mice, as they at once suspected, turned out to be valuable research animals for scientists studying diseases of the nervous system, such as epilepsy, in humans.

Jackson Laboratory

The oversensitive mice were bred at a unique mouse farm, known in scientific circles the world over, the Roscoe B. Jackson Memorial Laboratory. The Jackson Laboratory is located at Bar Harbor, Me. Neither the Laboratory nor its mice escaped the holocaust that destroyed millionaires' homes and all in its wake during the forest fire at Bar Harbor in the fall of 1947.

The original Laboratory building, the entire group of summer research buildings, two caretakers' residences, one story and a third wing of another building, 90,000 research mice, the whole laboratory, most of the equipment, all correspondence, most of the old records, all the collection of microscopic slide records, and all the current experiments of the main laboratory staff went up in smoke and flames. Other parts of the laboratory buildings were gutted, weakened and badly damaged.

Research on cancer and many other diseases was slowed in laboratories all over the world, in some cases completely stopped, because these laboratories depended on Jackson Laboratory for the mice that were helping them unravel the mysteries of disease.

The laboratory has come back, and so have the mice. Almost as soon as the flames had died away, rebuilding was begun. And, shortly after, the mice began arriving, a few from this place, a few more from another. The returning mice were descendants of those Jackson Laboratory had bred and supplied to other research laboratories. From these returned offspring, a colony of some 70,000 mice has been built up.

Between 2,000 and 4,000 mice are now being shipped from Jackson Laboratory each week to other laboratories for research use. But before the fire twice that number were shipped each week. And the demand for these inbred, standardized mice has not slackened. Right after the fire a letter arrived from a laboratory in Siam asking for mice for the first cancer research project to be started in that country. More than 150 major research laboratories in the United States besides many abroad, even in Moscow, depend on Jackson Laboratory for their mice for research not only on cancer but on infantile paralysis, influenza and other diseases.

It costs money to raise mice. Bed and board per mouse comes to about \$5 per year, which sounds trifling, but when multiplied by the laboratory's present mouse population of 70,000 it is a sizable sum. This is one reason why Jackson Laboratory, although it has received generous gifts for rebuilding since the fire, continues to need money to support its work.

Breeding and supplying special, standardized strains of mice may be the most widely known activity of the laboratory, but it is in a way only a minor activity. Cancer research, after all, is the main objective of the laboratory and has been since its founding as a memorial to the late Roscoe B. Jackson. Research in cancer can be done in two ways, the director of Jackson Laboratory, Dr. C. C. Little, explains. One is through an efficient attack on problems that can be defined and organized for study. This is the method that built the atom bomb from the theory of atomic energy. It is important as a method of cancer research and is being pushed in many laboratories.

The second method of cancer research is to use man's creative power and imagina-

tion to "bring from the unknown new knowledge for the benefit of mankind." This second method is the one followed at Jackson Laboratory. It is one which all connected with the laboratory hope will lead to the conquest of cancer, but which may instead lead to quite unforeseeable but equally important results.

That is the story back of the four-eared cat. She was contributed to Jackson Laboratory by Mrs. George Wood, of Ashtabula, Ohio. Mrs. Wood recognized that the cat was an oddity, but she was not content, as many a person might have been, to let it go at that. She suspected such an odd cat might have value to scientists of the kind working at Jackson Laboratory.

Four-Eared Mutation

The geneticists at the laboratory knew that the four-eared condition was a mutation, and they were curious as to what kind of a mutation it was. Would all of Mistress Four-Ears' descendants have four ears, too? So they bred the cat, and after two and a half years, Dr. Little and Research Assistant Edna DuBois have succeeded in getting Mrs. Four-Ears to bear four-eared offspring. The extra ears on mother and kittens, they say, are actually an overdevelopment of the lower ear lobes. The trait appears to be inherited recessively.

The theory that cancer, or a tendency to it, is an inherited trait has been the subject of extensive research at Jackson Laboratory



UNCOMMON MOUSE—When the bell rings this mouse has fits. Scientists hope to learn more about human epilepsy by studying this phenomenon in such animals.

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MRS. FOUR-EARS—This family of four-eared cats may lead to new discoveries about heredity.

and elsewhere. It was here that the maternal influence on the development of breast cancer was first detected in mother's milk (mouse—not human). This "influence" is now known as the milk factor which causes cancer in mice nursed by the female carrying it, but not in her offspring if they are foster-fed.

In studies of hereditary factors, in cancer or other conditions, factors of environment must also be considered and ruled out, if possible. So some of the work at Jackson Laboratory has turned to studies of environment as well as studies of genetics, or heredity as the layman terms it.

This is where the broadcasting pups come into the picture. How much of a dog's characteristics are due to his breed and how much to his environment? Is a wire-haired terrier lively and nervous because he is

a wire-hair or because he has learned that behavior from his mother as a puppy? How does a dog feel when he sees another dog, or his master? Does his heart beat faster? Taking a dog's pulse and blood pressure in the laboratory give one kind of information, but the Jackson Laboratory scientists wanted to know about a dog's reactions under more natural conditions. So Dr. John L. Fuller and co-workers developed an instrument, the radio-inductograph, to get such information. It is a compact shortwave radio set through which a dog can broadcast his emotional and physiological experiences while free and leading a normal existence. What the animals will tell on these records may be important for dogs, dog-owners and other animals and humans generally.

Science News Letter, July 2, 1949

Pont is for professional 35 mm motion picture projection. The film consists of three emulsion layers superimposed on one side of standard cine film base. Each layer contains the sensitive silver salts suspended in the new color former plastic.

In each emulsion the amount of dye in the final print is proportional to the amount of silver deposited by the first exposure and development.

The gelatin now in use for photographic films is made from the skin of calves. The quality and impurities of gelatin have a great effect on the sensitivity of the photographic emulsion. The plants that the animals eat affect the gelatin made from their skin. Two drops of mustard oil per ton of emulsion is enough to increase the sensitivity of a gelatin emulsion.

The synthetic resin can be made under controlled conditions and should be more uniform. The physical characteristics of some of the synthetic plastics may be better than that of gelatin. It may have better dimensional stability.

Science News Letter, July 2, 1949

Words in Science— TRANSONIC-ULTRASONIC

➤ **TRANSONIC** is a word used to describe the speed of very fast airplanes and projectiles which travel at or about the speed of sound. The speed of sound at sea level is about 760 miles per hour. Speeds from about 90% of sound's speed to 120% of it come within the range known as transonic. Speeds higher than that are called supersonic.

ULTRASONIC is not used in connection with aviation speeds. It is the word applied by scientists to sound waves of very high frequencies, with pitch beyond the limit of human hearing. Ultrasonic waves have various uses such as the testing of metals for flaws, killing of bacteria, and elimination of smoke.

Science News Letter, July 2, 1949

CHEMISTRY

Plastic for Photo Film

➤ **OLD-FASHIONED** gelatin, made from skin of calves, may in the future give way to a synthetic plastic as the emulsion material that coats photographic film and carries the chemicals that are affected by light and make the picture.

The replacement of conventional gelatin by a synthetic polymer resin in a Du Pont color printing film suggests that synthetic material may eventually be used in more photographic films.

Color film emulsions using gelatin have

a chemical put into them which makes the dyes stick to the silver image, called a color former. The new film uses the synthetic polymer to replace both the color former and the gelatin binder, thus making the one substance do the work of two.

Because the new color former plastic is only swollen by water, the dyes in the resulting picture are deposited in place and keep the picture sharper than by the older method.

The new color film announced by Du

HOUSES OF EARTH

The ground you stand on is your best building material. Easy to build—insulated against heat and cold. Ratproof—Soundproof—Termiteproof and Fireproof. Book based largely on findings of the Bureau of Plant Industry, Soils and Agricultural Engineering. Low Building and Upkeep costs.

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A. B. LEE

Box 171—Ben Franklin Station
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VETERINARY MEDICINE

Hard Pad Disease in Dogs

England's dogs are being attacked by a fatal disease which turns the pads of their feet to iron-like hardness. A virus is the responsible agent.

► A DISEASE that turns the pads on a dog's feet as hard as iron is rapidly displacing distemper as the number one killer of dogs in England.

It is called, logically enough, "hard pad disease". Like distemper, it is caused by a filterable virus. In some ways it seems to be a freak offshoot of distemper virus.

Most distinguishing characteristic of this new disease is that in most cases the pads on the dog's feet, and sometimes the end of the nose as well, become thick and hard.

When a dog with hard pad disease walks on a wooden floor its feet beat out a drum-like tattoo. Veterinarians in England now tap the pads of all distemper suspects with a pencil. A sharp clicking means hard pad disease.

In fact, in about half of the cases fits are the first symptoms of hard pad disease. Sometimes they are so violent that the dog dies before the pads have a chance to harden.

Other complications of the disease are severe diarrhea and edema of the lungs, the latter frequently being cause of death.

When a dog recovers from a typical case of hard pad disease the hardened pads and nose come away as perfect casts, leaving soft normal tissue beneath. Unfortunately, most dogs do not recover from hard pad disease.

There is, however, one bright spot in the picture. A team of researchers of Burroughs, Wellcome and Company laboratories have developed a very effective vaccine against the disease. The scientists are A. B. Macintyre, Dr. D. J. Trevan and Dr. R. F. Montgomerie.

Their vaccine is a 20% emulsion of infected dog spleen, with one-quarter of one percent formalin. One dose injected under the skin gives very effective protection.

They have also developed a strong serum for protecting dogs which have been exposed to the disease and for treating dogs already sick.

Immunization with hard pad virus does not protect against distemper, though immunity against distemper, especially if naturally acquired, may bestow some immunity against hard pad disease. But at best this cross-protection is unreliable.

First inkling of the presence of the disease in English dog population came in 1945, when complaints began coming in that supposedly reliable distemper serums and vaccines were failing to protect dogs against "distemper". Puzzled research workers could only surmise that this latter "distemper" was not the true distemper of dogs, for which the immunizing agents were designed and against which they were effective.

The British scientists set out to unravel the riddle. They soon discovered that the case histories of many of the sick dogs they examined were not typical of distemper.

In 1945, Dr. Margaret Scheitlin, a Swiss researcher visiting the English laboratories, pointed out to the team of scientists that in Switzerland when she found hard pads on a dog she could lay an odds-on bet that within a few days the dog would develop fits and convulsions. This fitted in with what the English workers found on checking over their own cases.

The virus seems actually to attack all the body tissues and the disease has been passed from sick dogs to ferrets by injection of foot pad, brain, spleen and lung tissue. In pregnant bitches it attacks the embryo and causes abortion. The virus has been recovered from the premature aborted embryos. On the other hand, the infection has been observed in a 13-year-old dog.

So far as is definitely known, cats do not get hard pad disease. One cat that had convulsions is regarded as a possible suspect, but it did not develop the typical hard pads such as is usually seen in infected dogs.

One curious fact that Dr. Montgomerie and his co-workers have uncovered is that some sulfa drugs, far from being a cure for the disease, actually help bring on the disease in laboratory-injected dogs. While the typical disease can readily be produced in ferrets by injection of hard pad virus, such injection in dogs ordinarily brings only a fever lasting about ten days to two weeks, after which the dogs get well. But when the English scientists gave their dogs certain of the sulfa drugs along with the

virus, five out of six dogs developed all the nervous symptoms, while three developed hard pads as well.

Science News Letter, July 2, 1949

VETERINARY MEDICINE

American Scientists Are Investigating Hard Pad

► HARD PAD disease of dogs is being investigated in this country, Dr. J. G. Hardenbergh, executive secretary of the American Veterinary Medical Association told Science Service.

Numbers of cases of the disease and the numbers of deaths it has caused among dogs in the United States are not known, Dr. Hardenbergh said, but the hard pad condition has been reported to occur in about five percent of dogs with symptoms of distemper.

Hard pad disease characteristics are not considered new to American veterinarians and more research is needed on this condition to distinguish it from other manifestations of distemper, Dr. Hardenbergh explained.

Science News Letter, July 2, 1949

MEDICINE

Radiation Fails Against Disease-Causing Worm

► SMALL-SCALE atomic warfare has thus far failed against the little worms that cause a relatively common American disease.

The worms, *Trichinella spiralis*, cause trichinosis, a disease humans get from eating raw pork containing one form of the worms. Drs. Joseph E. Alicata and George O. Burr of the University of Hawaii and the Hawaiian Sugar Planters' Association Experiment Station tried potent gamma radiation, one of the hazards of atomic bomb blasts, against meat containing the worms.

Results, reported in the journal, *SCIENCE* (June 10), show more or less a victory for the worms. The rays rendered female worms sterile. On the other hand, larvae encysted in meat, the form of the parasite which gives humans the disease, were not killed by the radiations used.

Next step, say the scientists, will be experiments with a larger dose of gamma rays. Aim of the work is a radiation treatment for meat which will protect against trichinosis.

Science News Letter, July 2, 1949

SCIENCE FILMSTRIPS

PHYSICS
GENERAL SCIENCE
CHEMISTRY
BIOLOGY
MICROBIOLOGY
ATOMIC ENERGY
LABORATORY SAFETY
HOW TO STUDY
PENCIL SKETCHING

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VISUAL SCIENCES

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SUFFERN, N. Y.

● RADIO

Saturday, July 9, 3:15 p.m., EDST

"Adventures in Science" with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. Benjamin Minge Duggar, of the Lederle Laboratories, American Cyanamid Company, Pearl River, N. Y., discoverer of aureomycin, will talk about "Golden Disease Fighter—Aureomycin."

MEDICINE

Methadon Habit-Forming

► **WARNING** that the new pain-relieving drug, methadon, may cause addiction was given physicians by Drs. Harris Isbell and Victor H. Vogel, of the U. S. Public Health Service Hospital, Lexington, Ky.

The doctors pointed out the falsity of the idea that methadon does not produce the pleasant feelings that come from morphine as taken by the addict and that a person does not become physically dependent upon the drug.

Studies carried out at the hospital under the auspices of the Drug Addiction Committee of the National Research Council show that methadon is a dangerous addicting drug, the physicians report in the *AMERICAN JOURNAL OF PSYCHIATRY* (June).

In fact, addicts prefer this drug to morphine, heroin or dilaudid.

To test the drug's effects, 15 former morphine addicts who volunteered were given four daily doses of methadon. The dosage was increased as tolerance developed from an initial five to 10 milligrams per dose to as high as 100 milligrams per dose in the three cases who stayed on the drug longest.

When they got only five milligrams per shot, none of the addictive drug effects

were noticeable, and the men complained about the drug. But when the dosage was increased to 10 to 15 milligrams per shot, the men began to express satisfaction with the effects although these did not become noticeable until after the third or fourth dose. Then the men's behavior became strikingly similar to that during addiction to morphine.

They stopped nearly all productive activity and spent most of their time in bed in a dreamy half-asleep state which they call being "on the nod," or "coasting." They neglected their persons and their quarters.

Shots of 20-30 milligrams of methadon produced particularly striking effects, the report states.

"The addicts would writhe in joy, and comment as follows: 'O boy! That's a fine shot of dope. Can we get it outside? Who makes it? Will it be put under the Harrison Law?'"

The methadon can be taken away from the patients without the severe withdrawal symptoms that follow when addicts are taken off morphine. It is used routinely in the hospital to wean morphine addicts from that drug. First, patients are switched to methadon, and then later the methadon

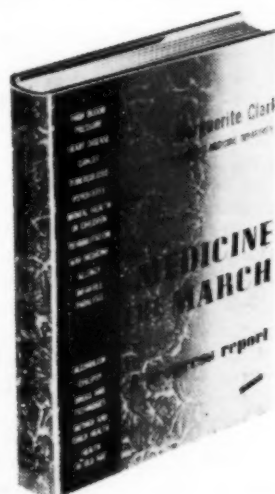
is taken away. It is the most satisfactory method of withdrawal yet found, the report states. But, it is pointed out, although the physical dependence on the drug is not so evident as with morphine, the emotional or mental leaning on the drug remains to be dealt with. Loss of emotional control occurs just as frequently following substitution and withdrawal of methadon as it does after withdrawal of morphine.

There is not much danger of addiction to methadon in the ordinary legitimate medical use of the drug, the report states. Signs of physical dependence on the drug were noticed in only two of 19 cases where it had been used for relief of pain in cancer for from 35 days to 180 days and even in these two cases, the symptoms were very mild. As long as the dosage of either morphine or methadon is held to the minimum required for pain relief, there is very little likelihood of addiction to either drug, the report concludes. The danger of "medical" addiction is "great only when physicians mistakenly believe that a drug is not addicting and are careless in its use."

Methadon is also known under the names of amidone, dolophine, and 10820.

Reinforcement of the warning by Drs. Isbell and Vogel is contained in an editorial in the *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* (June 11) which declares that the danger of addiction to methadon is almost as great as that for morphine.

Science News Letter, July 2, 1949



Here are the up-to-date facts on medicine's latest discoveries...

DURING the 5 year war period, American medicine advanced 25 years. Here is down-to-earth, accurate reporting of this advance in 15 important fields. The 15 chapters in this book cover the work of hundreds of top medical specialists and researchers in America and include the latest treatments, surgical techniques and drugs that have been tried out with success. Included for the first time is a comprehensive study of the use of radio-active elements in the diagnosis and treatment of disease.

The author, head of *Newsweek's* Medical Department, is Secretary-Treasurer of the National Association of Science Writers, and one of the few women members. She is widely known for her ability to write accurate, trustworthy medical articles in non-technical language the layman can understand.

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- Epilepsy
- Drugs & Techniques
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MEDICINE ON THE MARCH

A PROGRESS REPORT BY *by Marguerite Clark*

Head of Newsweek's Medical Department

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Before the Eagle

➤ **ALTHOUGH** this country has no national tree, as England has the oak and Canada the maple, a tree was used as symbol of American honor and independence long before the eagle was officially adopted as the device to be used on the Great Seal of the United States and subsequently on our coinage and currency.

Until the Continental Congress adopted a national flag and specified its basic design, each state flew a flag of its own. The flag of Massachusetts, which floated over the stoutly defended breastworks at Bunker Hill, consisted of a white field displaying a green pine tree, with the motto: "An Appeal to Heaven." This motto was suggested, no doubt, by the upward-pointing spire of the tree, so like the monitory steeples that reared themselves above all New England villages.

Even before it appeared on their flag, the pine tree was used as a symbol on the coinage of Massachusetts Bay Colony. The Pine Tree Shilling, struck in the seventeenth century, is one of the greatest of numismatic treasures.

Which particular pine tree was thus chosen for honor by the men of Massachusetts is not specifically stated, but there can be little doubt that it was the white pine. It was abundant in early days, it had great majesty and beauty, and was useful and

valuable as well as beautiful. Towering trunks cut from virgin forests made magnificent masts—important in a seafaring and shipbuilding community. Smaller specimens were hewn into logs for the early cabins, sawed into splendid, smooth lumber for the fine frame houses and churches that have made New England's early builders deservedly famous.

But alas! we could no longer adopt the white pine as our national tree even if we wanted to. For just as we have practically exterminated the American eagle from all save a few still-wild spots under American sovereignty, so have we wiped out most of our white pine forests. We have either prodigally chopped them down without taking the trouble to replant them, or more wastefully still, have permitted fire to ravage them unchecked. And the spread of a terrible tree disease, white pine blister rust, has made re-establishment of white-pine woodlands even more difficult.

Science News Letter, July 2, 1949

MEDICINE

Some Diaper-Marking Dyes Reported Poisoning Babies

➤ **WARNING** of a new danger to babies, especially premature ones, is issued by the *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* (June 25).

Aniline, or coal tar, dyes used to mark diapers can poison the babies, the chemical being absorbed through the skin. Such poisoning of 72 babies, five of them fatally, has been reported.

The danger can be simply prevented, the *JOURNAL* states, by boiling the diapers after they are stamped and drying them thoroughly before use. This fixes the dye so that it cannot be absorbed. Non-poisonous vegetable dyes, charcoal and silver nitrate are impractical for marking diapers because the marks from these fade with the repeated laundering in large institutions.

Science News Letter, July 2, 1949

ZOOLOGY

Mice Migrate Within Their Barn "World"

➤ **THE** "home country" of a common house mouse is not very large—a range of 60 feet for males and only 40 for the more timid females, Robert Z. Brown of the Johns Hopkins University discovered in the course of a study of mouse migrations within a large barn that constituted their world. He reported his observations before the meeting of the American Society of Mammalogists in Washington.

He live-trapped members of the barn's mouse population, estimated at 150 to 200, marked them for identification, and re-trapped them later to find out where and how far they had gone. There was a sea-

sonal migration as the weather grew colder in the winter, mice in the outer rooms of the barn leaving their home ranges and seeking more comfortable homes in an inner room filled with hay.

There was also a seasonal drop in the mouse population from a high in December to a low in February, and back again to high in April. Sharpest midwinter decreases took place among the juvenile and young-adult mice.

Science News Letter, July 2, 1949

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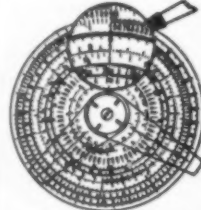
TECHNIQUES GENERALES DU LABORATOIRE DE PHYSIQUE—J. Surugue, preface by F. Joliot-Curie—434 p. illus., \$5.00. Are you interested in glass blowing, high temperature furnaces, spectrum measurements? Do you want to learn scientific French painlessly? If so, you will want the outstanding new book on laboratory techniques—how to do and make things—recently issued by the French National Center of Scientific Research. A profusion of drawings and illustrations with labelled parts virtually serves as a dictionary for the learning student. The collection of useful facts, gadgets, ideas and useful tabulations makes exciting reading, while each section has careful explanations of the physical principles involved. No book written in English serves the function of this book in French.

LES MOLECULES GEANTES ET LEURS APPLICATIONS—G. Champetier—\$4.00. An authoritative work written in non-technical style covering fundamental chemistry and physics applying to the large molecules followed by an inventory of compounds utilizing them: plastics, synthetic rubber, oils, varnishes and many others of industrial importance.

CHIMIE PHOTOGRAPHIQUE—L. Glafkides, preface by L.-P. Clerc—607 p., illus., \$8.00. Based on the author's own experience acquired in France and in the United States where he worked for several years, and also on 1,500 references. Covers the image, emulsions, sensitizing, reproduction in colors and a non-technical chapter on the fundamentals of chemistry. If you are an amateur photographer who wants to understand the science which makes possible your artistic results, you will be interested in this work.

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Books of the Week

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THE ARMY AIR FORCES IN WORLD WAR II, VOL. II: Europe—Torch to Pointblank (August 1942 to December 1943)—W. F. Craven and J. L. Cate, Eds.—*University of Chicago Press*, 896 p., illus., \$6.00. This volume, the second of seven compiled for the Army Air Forces, deals with the early phases of the air warfare in North Africa, Sicily, Italy, other occupied countries, and Germany.

BIOMETRICAL GENETICS: The Study of Continuous Variation—K. Mather—*Dover*, 158 p., illus., \$3.50. Based on the use of measurements, this book presents the kind of evidence upon which the genetic theory of continuous variation rests. For those who already have some knowledge of genetics and statistics.

BIRDS OF CONCORD—Ludlow Griscom—*Harvard University Press*, 340 p., illus., \$5.00. Based on a half century of bird notes by members of the Nuttall Ornithological Club and showing the effects of civilization on bird populations. For the nature lover and the ornithologist.

BITUMINOUS COAL: Facts and Figures—*Bituminous Coal Institute*, 148 p., illus., paper, 60 cents. Covers mining, distribution and consumption.

BOYS WANT TO KNOW—Jacob A. Goldberg—*New York Tuberculosis and Health Association*, 12 p., paper, free upon request to publisher, Social Hygiene Committee, 386 Fourth Avenue, New York 17, N. Y. (A stamped addressed envelope must be enclosed). This booklet answers a few of the questions which teen-age boys might ask about social adjustment, sex, and physical and mental health.

THE COMPLETE BOOK OF POTTERY MAKING—John B. Kenny—*Greenberg*, 242 p., illus., \$7.50. Includes the fundamentals of the artcraft as well as the highly technical skills.

ECONOMIC AND SOCIAL PROBLEMS IN THE UNITED NATIONS: World Food Problems—*Department of State*, 7 p., paper, free upon request to *Office of Public Affairs*, U. S. Dept. of State, Washington 25, D. C. Correction. (See SNL, June 4.)

ELECTRIC RESISTANCE STRAIN GAUGES—W. B. Dobie and P. C. G. Isaac—*English Universities Press* (Distributed in this country by *Macmillan*.) 114 p., illus., \$3.50. A description for engineers, of gauge techniques and applications from weighing aircraft to estimating stresses in the brain of a dog. Of British origin.

GENERAL CHEMISTRY—A. W. Laubengayer—*Reinhart*, 528 p., illus., \$4.25. A first-year college text for those who desire to go on in chemistry or related fields.

GEOMETRY, VOL. II: Elementary Mathematics from an Advanced Standpoint—Felix Klein—*Dover*, 214 p., illus., \$2.95. For advanced students and teachers.

HOME STUDY BLUE BOOK—J. S. Noffsinger—*National Home Study Council*, 32 p., illus., paper, free upon request to publisher, 839 17th Street, N. W., Washington, D. C. Includes

a directory of approved home study schools and courses.

HYDROLOGY—Oscar E. Meinzer, Ed.—*Dover*, 712 p., illus., \$4.95. One of a series of books prepared by the National Research Council to give the non-specialist reader a summary of knowledge in the earth sciences. This has to do with rain, snow, drought and food and the water on the earth in general.

THE INCANDESCENT LIGHT—A Review of Its Invention and Application—*Thomas Alva Edison Foundation*, 76 p., illus., paper, 70 cents. The first in a series which will cover the most important inventions of Edison based on about 2500 notebooks left by him. Foreword by Charles F. Kettering.

INDIVIDUAL BEHAVIOR: A New Frame of Reference for Psychology—Donald Snygg and Arthur W. Combs—*Harper*, 386 p., \$3.50. Correction. (See SNL June 11.)

INTRODUCTION TO THE THEORY OF FOURIER'S SERIES AND INTEGRALS—H. S. Carslaw—*Dover*, 3rd. rev. ed., 368 p., illus., \$3.95. A large number of corrections included since the last printing.

JAMES WATT AND THE HISTORY OF STEAM POWER—Ivor A. Hart—*Schuman*, 250 p., illus., \$4.00. A biography of the great 18th-century Scotch engineer and an account of his contribution to the history of human progress.

MAGNETIC RECORDING—S. J. Begun—*Murray Hill*, 242 p., illus., \$5.00. Brings together full and accurate information on this electronic development.

MATHEMATICAL FOUNDATIONS OF STATISTICAL MECHANICS—A. I. Khinchin; translated from the Russian by G. Gamow—*Dover*, 179 p., illus., \$2.95. New material included in this book is the systematic use of limit theorems of the theory of probability for rigorous proofs of asymptotic formulas without any special analytic apparatus. Primarily for the mathematician.

MEDICINE ON THE MARCH: A Progress Report—Marguerite Clark—*Funk & Wagnalls*, 308 p., \$3.50. A review of the advances of the five-year war period as they have been reported in authoritative medical literature, government reports, papers read at medical meetings.

MICRO-WAVES AND WAVE GUIDES—H. M. Barlow—*Dover*, 122 p., illus., \$1.95. A complete survey of this field written for the engineer and physicist by a leading authority.

MODERN PLASTICS ENCYCLOPEDIA—Gordon M. Kline, Editorial Director—*Plastics Catalogue Corporation*, 1371 p., illus., \$5.00. A standard reference work designed as a working guide to all phases of plastics planning and production.

MOLECULAR INTERACTION—Roy Waldo Miner and Paul Lenihan, Eds.—*The New York Academy of Sciences*, 851 p., illus., \$4.00. The results of a Conference held by the Section of Physics and Chemistry on April 9 and 10, 1948.

MOST OFTEN NEEDED 1949 TELEVISION SERVICING INFORMATION—M. N. Beitman—*Supreme Publications*, 192 p., illus., paper, \$3.00. Factory data on popular and interesting sets of the more important manufacturers. Many diagrams.

PRE-MEDICAL PHYSICAL CHEMISTRY—F. A. Matsen, Jack Myers, and Norman Hackerman—*Macmillan*, 344 p., illus., \$4.75. Presupposes knowledge of general chemistry, analytical chemistry, physics and mathematics.

THE SKIN PROBLEM FACING YOUNG MEN AND WOMEN—Herbert Lawrence—*Timely Publications*, 70 p., paper, \$1.50. An explanation for the layman of this common teen-age problem.

TELEPHONE AND TELEGRAPH: A Public Primer about Wire, Cable, and Radio Common Carriers . . . Their Development, Operation, and Regulation—Federal Communications Commission—*Gov't Printing Office*, 29 p., paper, 10 cents.

Science News Letter, July 2, 1949

WILDLIFE

Chipmunks Have Definite Ranges for Food-Gathering

WESTERN chipmunks have definitely established ranges where they exercise exclusive food-gathering rights, Harold E. Broadbooks of the University of Michigan told members of the American Society of Mammalogists in Washington. For females, the home range has an average extent of 2.36 acres; for males, 3.8 acres. The range area tends to be larger in summer than in spring or fall.

Mr. Broadbooks learned where these little animals consider themselves "at home" by live-trapping them on a 42-acre tract in a yellow pine forest, and marking them with dye so that he would know them when he saw them again. He noticed that all ranges overlapped, but that the extent of the overlap of any one individual was always small.

Chipmunks captured and carried as much as a mile from their ranges found their way home again.

Science News Letter, July 2, 1949

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☛ **DOOR HANDLE**, to replace the knob that has to be turned, is an attractive plastic affair with a push-button at its center. Thumb pressure on this button releases the latch bolt so that the door can be opened. Closing the door relocks the latch.

Science News Letter, July 2, 1949

☛ **STEAM IRONING** attachment for an electric flatiron can be removed when the flatiron is used in ordinary work. The steam ironing surface has a space between it and the regular iron into which water from a reservoir drips slowly to be converted instantly into steam by the heat of the flatiron.

Science News Letter, July 2, 1949

☛ **MOLECULAR WEIGHT** meter utilizes the freezing-point method in determining the molecular weight of liquids and solids. In operation, the apparatus is plugged into a 115-volt line, and ice put in its Dewar flask. The freezing point of a liquid of known molecular weight is determined and compared with the freezing point when the material of unknown molecular weight is added to it.

Science News Letter, July 2, 1949

☛ **SEALED BEAM** headlight for bicycles, shown in the picture, is similar to the type used on automobiles and produces a beam



pattern approximately five feet wide and 30 feet long, or three times the light given by the ordinary bicycle lamp. It operates on a battery of the five-volt hand-lantern type.

Science News Letter, July 2, 1949

☛ **STEAM CLEANER**, improved portable high-pressure type designed particularly for automobile service stations and small industrial plants, is featured by instant starting, instant steaming, and automatic nozzle control mechanism which permits

operator to stop and start the machine at the cleaning job.

Science News Letter, July 2, 1949

☛ **PLASTIC HANDLE**, for the candy-on-a-stick combination that youngsters enjoy, provides safety from stick-injury because it is made of a material that flexes, or bends, on the slightest impact. This odorless, tasteless, sanitary safety handle is flat and without a point or sharp edge.

Science News Letter, July 2, 1949

☛ **CALCIUM CHLORIDE** moisture absorption unit, for use to dry damp basements, rooms and closets, consists of a V-shaped basket to hold the salt and a deep metal drip-pan, which has a handle like an ordinary basket for easy carrying and to hold the salt container in place. A spout makes it easy to empty.

Science News Letter, July 2, 1949

☛ **PORTABLE DISHWASHER**, for the small family, is set when needed on the drain-board of the kitchen sink and attached to the hot water faucet with a length of hose. The dish-holding basket inside is rotated by four jets of water, and dishes are quickly washed by water pressure and soaking action.

Science News Letter, July 2, 1949

Do You Know?

The *magnesium* supply seems inexhaustible; it occurs world-wide in sea water.

Sulfuric acid is the main byproduct of the zinc industry; it is made with the sulfur gases given off in roasting the zinc concentrates.

The *pectin* necessary to make jelly gel can be bought in stores; reliance on the uncertain amount present in the fruits is no longer required.

When a way is found to give a moderate amount of *ductility* to ceramic and metal combinations, a whole new series of useful engineering materials will be available.

The U. S. Signal Corps is using in Alaska low-frequency, high-power radio transmission to decrease the interference with radio communications in the polar region that engineers call "*auroral absorption*."

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